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STONE ART IN AMERICA

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In the December number of the *American Naturalist* Mr. Read, of the British Museum, has an article which exhibits a strange misunderstanding of the American problem of "paleolithic" man. It is a comment on a recent publication by Mr. J. D. McGuire, and is a naive misinterpretation of Mr. McGuire's position. A brief statement of the present condition of this question may save other well-meaning men from falling into like errors.

In the years 1867–1873, inclusive, a number of scientific men were engaged in exploring western Colorado, southern Wyoming, eastern Utah, and northern Arizona, in company with the writer. The country was then a wilderness, and the tribes inhabiting it were practically unknown before that time. They were many, yet each one embraced but a small number of persons, while they were scattered at wide intervals.

In a little valley north of the Uinta mountains a tribe of Shoshoni Indians were found still manufacturing stone arrow-heads, stone knives, and stone spears. Although a few of them were armed with guns purchased at far-distant trading stores, a greater number of the men and boys were armed with bows and arrows. In the valley which they occupied chalcedony is found in the form popularly called moss-agate. In 1869 the writer often saw these Indians manufacturing stone arrow-heads and stone knives. These were made from masses of moss-agate weathering out of the sandy shales of the district. The implements were made by breaking the masses with rude stone hammers, and selecting favorably shaped fragments to be further fashioned by the use of little stone hammers. A fragment held in one hand, protected by a piece of untanned elk skin, was wrought with a hammer held in the other hand. Having somewhat improved the original fragment in this manner, a workman would proceed to give his implement the final shape by using a deer-horn tool from 8 to 12 inches in length and worked down from its original size by grinding, so that its diameter was about five-eighths of an inch. Holding the specimen in one hand, with the implement in the other, he would work the little stone into the desired shape by sudden pressure on its edge with the horn tool and in this manner breaking off small flakes. The arrow-heads thus made were small, slender, and symmetric, while the stone knives were given keen but somewhat serrated edges. I visited this tribe of Indians many times and lived among them many months and found their camps strewn with the chips, among which were many discarded failures, all having the characteristics of those finds which in the eastern portion of the United States had been called "paleolithic." These Shoshoni were making "paleolithic" implements, in that all were chipped and none were polished.

At another time, on the eastern slope of the Wasatch mountains, I was with a tribe known as the Pahvant, and found them making stone arrow-heads and knives by the processes of breaking, battering, and grinding. They were making "neolithic" implements and no others, and this I observed many times through a succession of years.

At various times through a series of years I saw the Uintah Indians, a tribe living in the Uintah valley, on the eastern slope of the Wasatch mountains, make arrow-heads and stone knives, both by chipping and grinding.

At other times, again and again, for years, I saw the Pagu Indians manufacture stone implements in the valley of San Rafael, a tributary of the Colorado flowing from the eastern slope of the Wasatch plateau. These people made their implements by chipping. A mile above the mouth of the river, in a cottonwood grove, there is a village site which has been occupied intermittently for many years and probably for many centuries. In the Cretaceous bluffs near by great quantities of chert are found, and not far away quantities of moss-agate. From these materials the Indians made their implements by chipping, and near the village site the flakes, rejects, and accidents may be found in great quantities, measured by wagon-loads.

In the valley of the Kanab, which is a tributary of the Colorado, are to be found the sites of ancient villages of the Uinkaret. These people made their stone implements of chert, moss-agate, and quartzite by chipping, and their pipes of steatite by grinding and boring—that is, they were polished.

The Tusayan Indians, on a tributary of the Little Colorado, have stone implements, pipes, and many other stone articles. Arrow-heads and knives are made chiefly by chipping, though a few are made by grinding; other objects in stone are often made by grinding and boring.

I have often seen all of these Indians and many others work in stone, for I have lived among them many years. By the criteria which are used to distinguish "paleolithic" man from "neolithic" man, some of the tribes were "paleolithic," making their implements solely by chipping; others were "neolithic," because they made their implements in part by chipping and in part by grinding. The criteria, therefore, do not apply to these Indians as a time distinction, nor do they apply to them as a culture distinction. All forms of "paleolithic" and "neolithic" implements were found to be made at the same time and by people in the same stage of culture, adapting their work to the materials found, while the chips and rejects, even to the so-called turtle-back forms, were produced in great abundance, though the turtle-back forms were rarer from the fact that they are chiefly derived from storm-fashioned bowlders.

Such facts were observed not by myself alone, but by others, who were geologists and archeologists.

We now reach another phase of the question. In the eastern portion of the United States many so-called "paleolithic" finds have been made in a region of country extending from the Hudson to James river. These implements were freely gathered into our museums and distributed to the museums of Europe. One particular locality early attracted the attention of the writer—that on Piney branch, in the District of Columbia. Over this site I have wandered many scores of times. The implements found here were by many believed to be "paleolithic" and to be a part of the gravel deposits found in the bluffs. In the examination which I made of them I found them strangely like the forms found near the Shoshoni village site, near the Pahvant village site, near the Uintah village site, near the Uinkaret village site, and near the Tusayan village sites, except that the turtle-back forms were much more abundant on Piney branch. Here we find the flakes or chips; here we see the turtle-back forms or rejects, and here we have the spoiled implements; and from this particular site many museums have been stocked with specimens illustrating the workmanship of "paleolithic" man. Years went by and the problem which I had contemplated so many times grew in interest, until at last the geologists and paleontologists decided that this particular gravel represents the Potomac formation belonging to the Cretaceous system. Now the problem assumed still greater importance, for if these vestiges of the work of man were actually deposited in the gravels at the time of their formation as shore accumulations, then the age of man must be carried back to Cretaceous time. Thereupon one of my associates, Mr. Holmes, assumed the task of solving the problem and was furnished with funds for the purpose, and he commenced at this particular site and trenched the Piney branch hill with care, remaining with his laboring force from day to day and from month to month. In doing this work it was clearly demonstrated that the gravels were not in the place where they were deposited by waves—that is, that they were gravels redistributed by overplacement, and that the manufacture of the stone implements could not be assigned to a period farther back than a few centuries. Thus "paleolithic" man was lost from the Cretaceous period. But Mr. Holmes' work did not stop here. He studied the village sites found in far-away towns by the river and found the stone implements which had been scattered there in modern times, and again found all the forms discovered at Piney branch, together with a much greater number of finished implements; and by a series of researches, the stages of which he has recorded in his deft manner, connected the two.

Mr. Holmes did not end his work at this stage; he went on from point to point down to the James and up to the Hudson, trenching the bluffs and examining the village sites, and everywhere demonstrating that the so-called "paleolithic" implements were of comparatively modern origin. Now in this region of country there are many gravels of different ages, extending from those of the Potomac formation below to the latest Pleistocene deposits above. In all of these gravels he found quarry sites with chips, rejects, and broken implements, and in the same manner he connected the artificial material with the village sites.

Thus throughout the eastern portion of the United States the old sites of "paleolithic" implements were examined and many new ones were discovered, and ever they told the same story. Then Mr. Holmes extended his observations far westward into many states and found kindred facts in many localities, and no facts inconsistent with those of eastern United States.

These observations did not rest on the shoulders of Mr. Holmes alone; many other American geologists visited him during the time he was occupied in examining the Piney branch site, and at other times in other places; and so far as I know all of the geologists who visited the sites at the time the excavations were made fully and cordially agree with Mr. Holmes.

One case now remains unexplained. At Newcomerstown, in Ohio, a rude stone implement was found in what was supposed to be a glacial gravel. The man who found it was doubtless honest in his belief that it was a genuine glacial find, though he did not claim to be a geologist. Mr. Holmes and others have visited the site since that time, but it has been changed to such an extent that it is impossible to determine whether the gravels were in place as primitively deposited, or whether they were in gravels modified by methods not understood at the time the find was made, though now well understood by geologists engaged in the study of glacial phenomena. Thus the evidence of "paleolithic" glacial man in this country has been narrowed to the single find at Newcomerstown, made by a man not trained as a geologist though doubtless intelligent and honest, and made many years ago under conditions which have now been changed so that it is impossible to discover the geologic facts. Such is the status of the "paleolithic" problem in America.

Other finds have been made on the Pacific coast, which, if genuine, carry man back in Pleistocene time, as an associate with extinct animals. These finds were made many years ago and have not been reëxamined by the new methods of research, but they do not bear on the problem of "paleolithic" man, for if the conclusions reached from the finds in California are to remain as valid, then this early man was "neolithic," since he made polished implements.

Wherever the facts are known in this country chipped and ground implements are essentially contemporaneous. Some of the lower tribes in North America make chipped implements; others make battered and ground implements, while still others make both, and the character of the materials which they use determines the method of production. In a region where quartz in its various forms, as flint, chert, agate, chalcedony, etc., are found, and often where quartzites are abundant, and especially where obsidian abounds, implements are made by chipping. Where softer quartzites and the metamorphic and igneous rocks abound, battering and grinding is the process used. In North America thousands of tribes were found making stone implements, and how they made them is well known. Stone implements are still made by many tribes, and the process by which they are made can yet be observed, and everywhere the Indian adapts his process to the materials used. Several of our observers have become adepts in the manufacture of stone implements. Mr. Holmes, Mr. Cushing, and Mr. McGuire can make stone implements as deftly as any Indian and produce forms even superior to the best of native manufacture. From observation and from experience, the method of battering and grinding is found to be simpler and more easily acquired than that by chipping.

Now, let us see where the problem stands:

First. Two methods of making stone implements are observed and practiced, each adapted to a particular class of material; that by battering and grinding is the more obvious and simple, while it involves less labor than the chipping process.

Second. The Indian tribes adapt their methods to the material.

Third. Some tribes make their tools exclusively by the chipping process; other tribes exclusively by the battering and grinding process, while still other tribes make stone implements by both processes.

Fourth. In studying the practices of extinct tribes it is discovered that the articles of stone-work are found in two places: one where the materials were quarried, and one where the implements were finished. If the quarry sites are examined, chips, rejects, and broken implements are discovered in great abundance. If the village sites are examined, finished implements are common.

Fifth. It is found that the existing Indians sometimes go to distant quarries and select the materials for stone implements, which they rudely fashion for the purpose of making a selection, and carry these inchoates to their homes to be worked into final form.

Sixth. It is found that the extinct Indians had the same practice, for quarry refuse may be found at quarry sites and finished implements at village sites, all of the same materials. Then, deposits of unfinished tools are sometimes found.

Seventh. In America it has long been conceded by those who believe in "paleolithic" art as a time or culture distinction that the chipping of implements is not its distinguishing trait, but that the distinction is found in a particular character of chipped implements, *i. e.*, as flakes which we now call chips, as turtle-back forms which we now call rejects, and as rude blades, often broken, which we now call accidents. It has been made clear that these are quarry forms, and that the sites where they are found are to some extent distinguished from village sites; and further, that the quarry forms must not be interpreted as belonging to the time when the formations were laid down unless clear geologic evidence demands it, and that only the geologist skilled in the study of overplacement can properly distinguish between primeval gravels and disturbed gravels.

In view of these facts, abundantly demonstrated far and wide over the continent, many American archeologists and geologists have reached the conclusion that the distinction between "paleolithic" man and "neolithic" man, as determined by the method of making the implements, is not valid for this continent. If these facts or the conclusion flowing from them startle European observers in geology and archeology, it behooves them to reexamine their own facts, and if by the new methods of geologic observation they can demonstrate a time distinction between exclusively chipped implements and mixed implements fashioned by both processes we shall not fail to accord belief to their conclusions; but we shall hold the question open until assured that the new methods have been tried.